

THE PEBBLE FINES CONTRIBUTION INTO RADIATION ENVIRONMENT OF THE RIVER YENISEI FLOODPLAIN IN THE INFLUENCE ZONE OF THE KRASNOYARSK MINING AND CHEMICAL COMBINE (KMCC)

SUKHORUKOV F.V., MELGUNOV M.S., CHUGUEVSKII A.V.

Institute of geology and mineralogy SB RAS, Novosibirsk, pr. ac. Koptyuga, 3, Russia

ms_mike@mail.ru

The main radioactive contamination of the river Yenisei floodplain is bound up with activity of Krasnoyarsk mining and chemical combine(KMCC). Numerous data on contamination of the Yenisei floodplain by gamma-, beta- and alpha-emitting radionuclides are concerned alluvial soils, bottom sediments, aqueous and surface plants. The possibility of radioactive contamination of the river bed pebbles, including those underlying alluvial soils and bottom sediments, earlier practically was not taken into account. Moreover, it is considered, that they are not contaminated by technogenic radionuclides.

The results of investigations of radioactive contamination of the river Yenisei bed pebbles in an influence zone of KMCC (especially in its short-range part) are presented in this work. It is demonstrated, that pebbles can contain up to 30 % of the total amount of the gamma-emitting radionuclides of the floodplain not only in places with overlying soils, but also in normally washing riverside sections of islands and banks, dried up only at very low level of water in the river. Taking into account an amount of the radionuclides, which were accumulated in pebbles, considerably increases an estimation of their general reserves in the floodplain. Calculations show, that density of contamination of the pebble fines by Cs-137 and Eu-152 in some areas, for example in a head of the Beryozovy island, may attain the value of 1 Qi/km² and more for upper 10 cm. It is necessary to note, that the pebble fines of the left-hand bank of Yenisei, which is not contaminated, are characterized by low activity of Cs-137 (less than 10 Bq/kg) and the complete absence of other technogenic radionuclides. It is completely agreed with directions of contamination plumes spreading exclusively along the right-hand riverbank. Mineral and granulometric compositions of the fines of the left-bank pebbles are similar to those, typical for the contaminated pebbles of islands and the right-hand riverbank.

Some sections of the river with potentially contaminated pebbles are characterized by very intensive growth of aqueous plants, bottom dwellers and plankton. The processes of their life activity can result in repeated mobilization of the technogenic radionuclides deposited in the pebbles with their subsequent inflow in organisms of fishes. Therefore we consider that it is incorrect to neglect the contribution of radioactive contamination of the pebbles to the total radioecological estimation of the river Yenisei ecosystem.